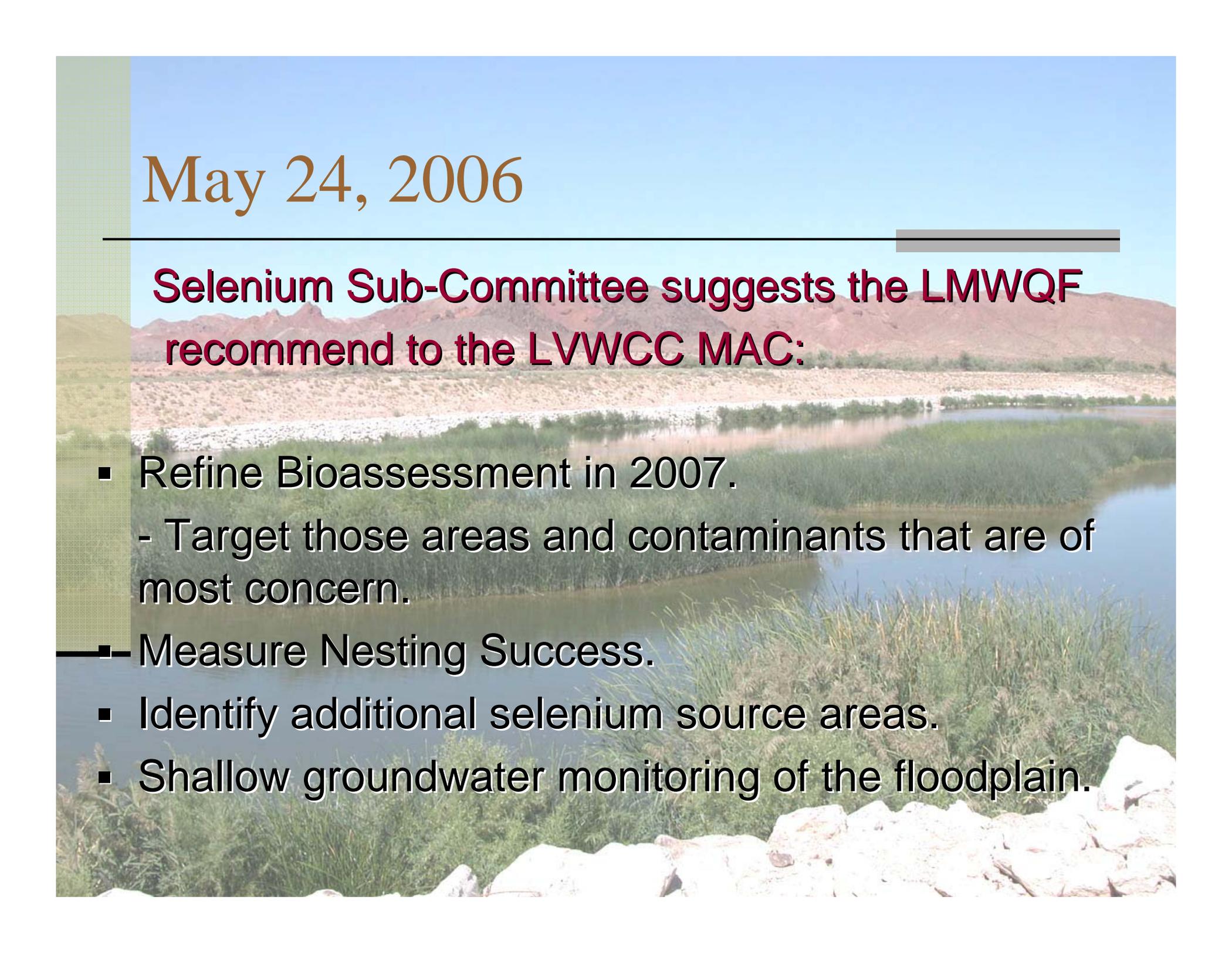


# Selenium Research in the Las Vegas Valley, Nevada

Peggy Roefer  
Lake Mead Water Quality Forum  
January 23, 2007



# May 24, 2006

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## **Selenium Sub-Committee suggests the LMWQF recommend to the LVWCC MAC:**

- Refine Bioassessment in 2007.
  - Target those areas and contaminants that are of most concern.
- Measure Nesting Success.
  - Identify additional selenium source areas.
  - Shallow groundwater monitoring of the floodplain.

# July Meetings

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- July 5, 2006 – Research and Environmental Study Team – Reviewed and approved suggested research
- July 10, 2006 – MAC – Requested budget proposal with Selenium Sub-Committee recommendations and requested an investigation into selenium treatment or dilution options

# 2007 Bioassessment

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- Refine locations and contaminants for water, sediment, fish tissue, and bird egg sampling

- Locations

Nature Preserve

Duck Creek (near Whitney Mesa)

Henderson Demonstration Pond

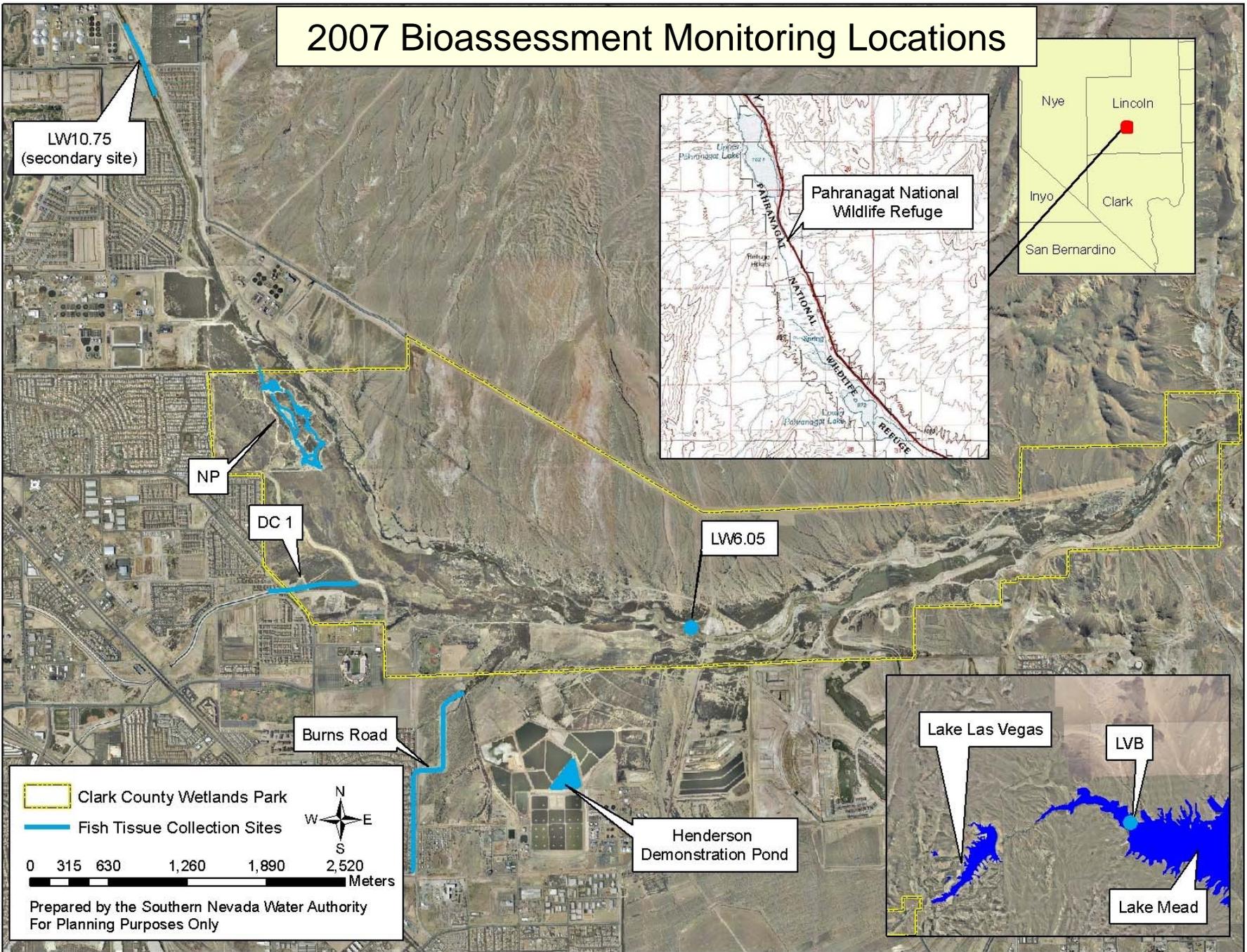
Burns Road/Pittman Wash 2

LW6.05 – Pabco Road

Las Vegas Bay

Pahrnagat National Wildlife Refuge

# 2007 Bioassessment Monitoring Locations



LW10.75  
(secondary site)

NP

DC 1

LW6.05

Burns Road

Henderson  
Demonstration Pond

Lake Las Vegas

LVB

Lake Mead

Pahrump National  
Wildlife Refuge

Nye Lincoln  
Inyo Clark  
San Bernardino

Clark County Wetlands Park  
Fish Tissue Collection Sites

0 315 630 1,260 1,890 2,520 Meters

Prepared by the Southern Nevada Water Authority  
For Planning Purposes Only

# 2007 Bioassessment

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- Water quality and sediment samples will be collected at each site
- Six bird eggs and six fish tissue samples will be collected at each site
- Samples will be analyzed for organic and inorganic contaminants
- Results will be analyzed by a qualified toxicologist

# Measure Nesting Success

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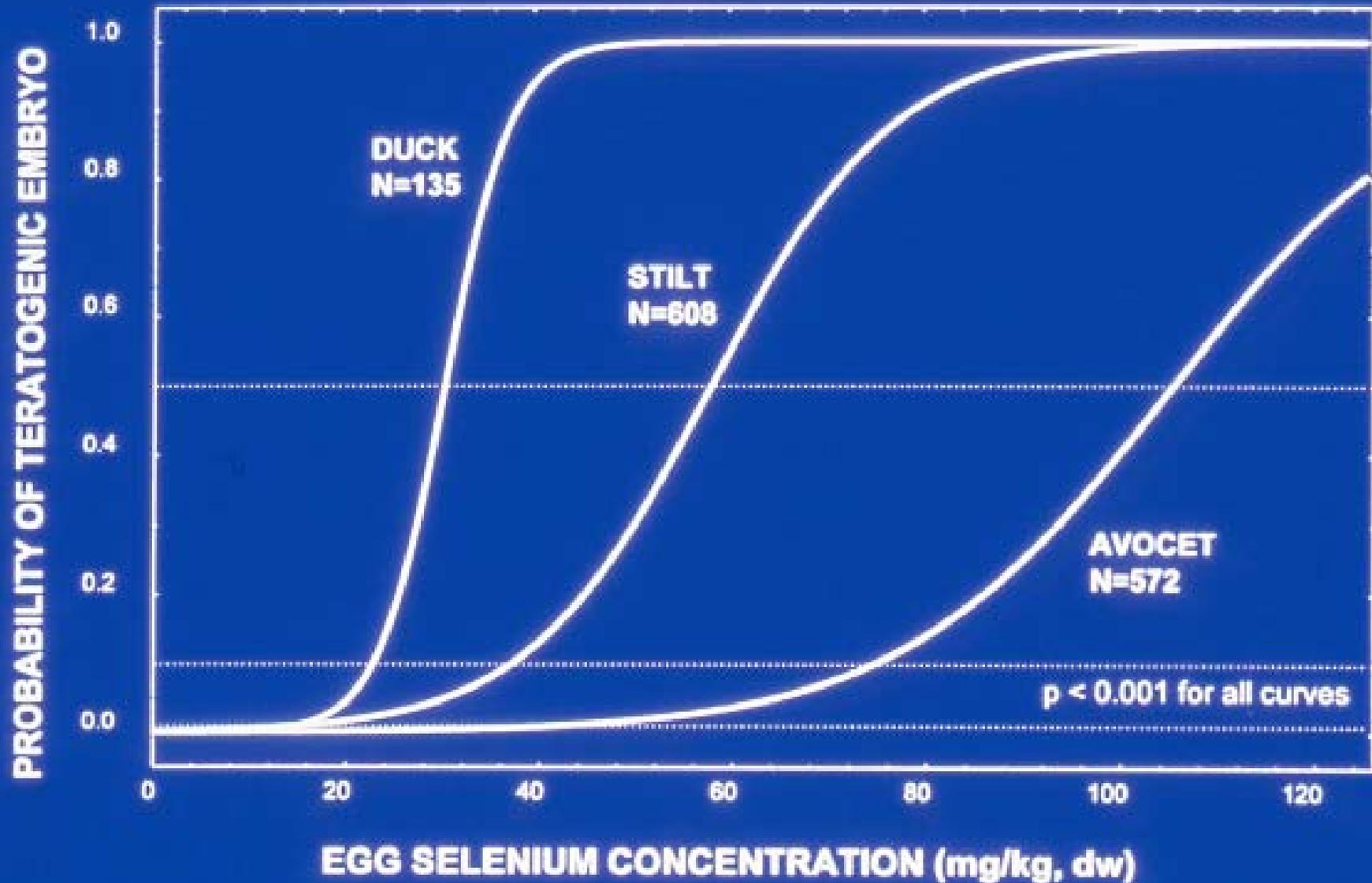
- Identify Target Species
  - Identify nests
  - Monitor nests
  - Collect late term eggs
  - Incubate eggs
  - Determine if deformities exist
- 
- A landscape photograph of a wetland area. In the foreground, there are large, light-colored rocks. Behind them is a body of water with green reeds and grasses growing along the edges. In the background, there are reddish-brown mountains under a clear blue sky. The image is used as a background for the text.

# Measure Nesting Success

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- Based on consultation with Dr. Joseph Skorupa, bird nesting success not necessary at this time
- Use data generated in USFWS report “Reconnaissance Survey of Selenium in Water and Avian Eggs at Selected Sites Within the Phosphate Mining Region Near Soda Springs, Idaho, May – June 1999” to determine percent bird nesting success.

## SELENIUM-INDUCED TERATOGENESIS IN NATURE LOGISTIC RESPONSE CURVES

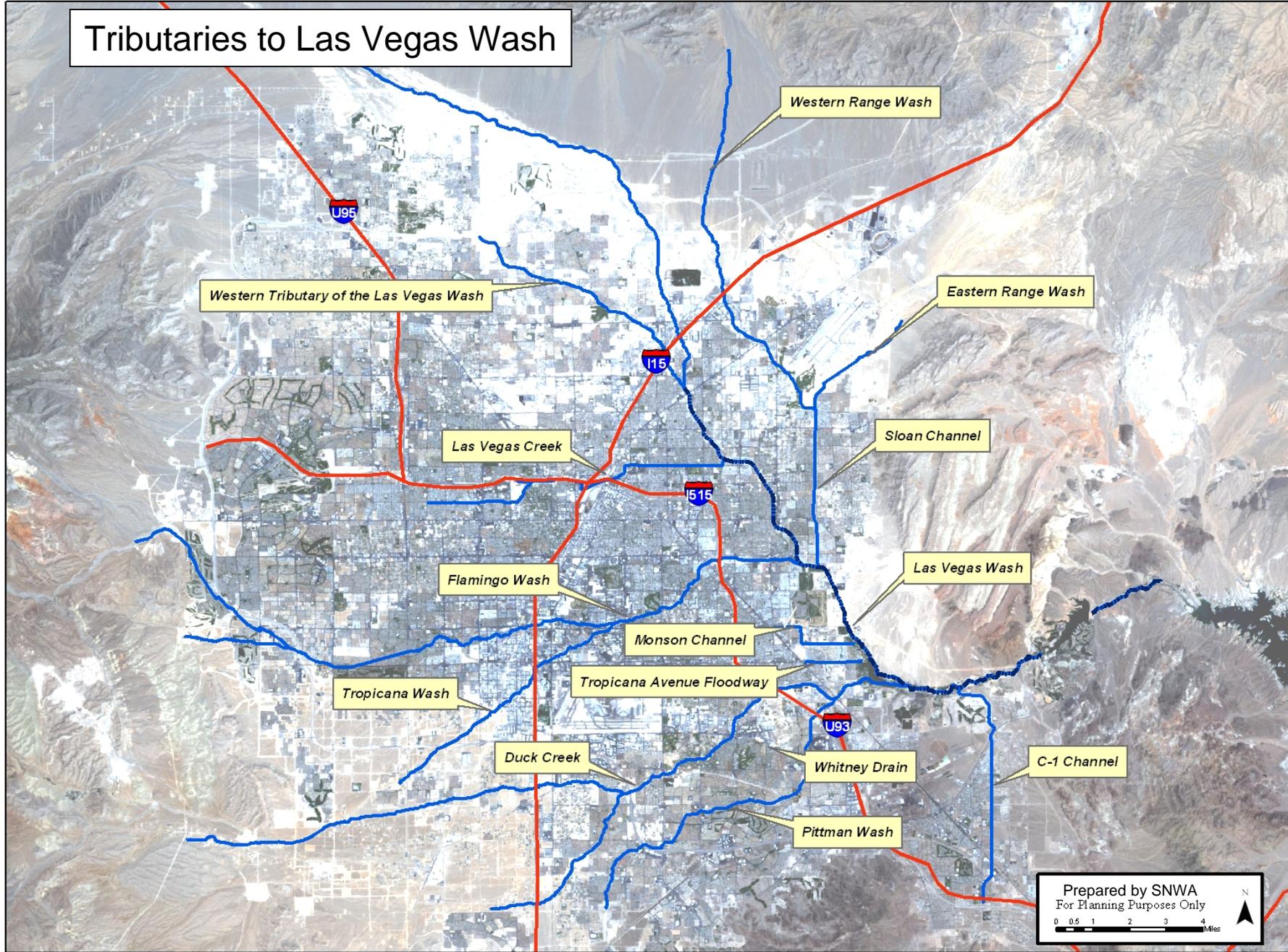


# Identify Additional Selenium Source Areas

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- Water samples collected on twelve tributaries to the Wash and in Wash above wastewater discharge
- Samples collected every ½ mile
- Samples collected on drains flowing into Wash
- Samples collected summer and winter
- Locations with elevated Se will be recollected and analyzed for cations/anions and Se

# Tributaries to Las Vegas Wash



Prepared by SNWA  
For Planning Purposes Only  
0 0.5 1 2 3 4 Miles

# Identify Additional Selenium Source Areas

<b>Tributary</b>	<b>Length</b>	<b>No. of Samples</b>
<b>Duck Creek</b>	<b>22 miles</b>	<b>44</b>
<b>Whitney Drain</b>	<b>2 miles</b>	<b>4</b>
<b>Pittman Wash</b>	<b>12 miles</b>	<b>24</b>
<b>C-1 Channel</b>	<b>7 miles</b>	<b>14</b>
<b>Las Vegas Creek</b>	<b>14 miles</b>	<b>28</b>
<b>Las Vegas Wash</b>	<b>23 miles</b>	<b>46</b>
<b>Sloan Channel</b>	<b>5 miles</b>	<b>10</b>
<b>Eastern Tributary RW</b>	<b>4 miles</b>	<b>8</b>
<b>Western Tributary RW</b>	<b>12 miles</b>	<b>24</b>
<b>Monson Channel</b>	<b>3 miles</b>	<b>6</b>
<b>Tropicana Wash</b>	<b>8 miles</b>	<b>16</b>
<b>Flamingo Wash</b>	<b>24 miles</b>	<b>48</b>
<b>Tropicana Ave. Floodway</b>	<b>2 miles</b>	<b>4</b>
	<b>Total</b>	<b>276</b>

# Shallow Groundwater Monitoring in the Flood Plain

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- Water level will be tracked using a transducer over time in 5 shallow wells from the Nature Preserve to the Pabco Road ECS + one deeper well in the Nature Preserve
- Samples will be collected monthly from the 5 wells and analyzed for selenium and cation/anion
- Two soil horizons will be characterized using SEM and clay mineralogy and analyzed for surface area, particle size, and sequential extractions for Se will be performed.

# October Meetings

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- October 4, 2006 – R&E Monitoring Study Team reviewed funding presentation for MAC
- October 10, 2006 – MAC reviewed and approved funding for selenium research requested by Selenium Sub-Committee and approved request for 319 grant funding for selenium treatment research

# Total for Selenium Sub-committee Request

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Bioassessment = \$250,550

Identify Additional Selenium Source Areas = \$32,200

Shallow Groundwater Monitoring in Flood Plain = \$59,800

**Total= \$342,550**

USBR funding has been requested

# Selenium Treatment or Dilution Research using 319 Grant Funding

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- Variability in selenium concentrations in the influent and effluent of wastewater treatment plants
  - Weekly influent/effluent at three WWTF
  - Influent and effluent of major processes 10 times
  - Hourly sampling influent for 24 hour period 4 times
- Bench scale testing of wastewater treatment process to determine selenium removal

# Selenium Treatment or Dilution Research using 319 Grant Funding

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- Applied for EPA 319 grant funding for project in November 2006
- Total cost of grant - **\$100,000**
- Funding approved January 2007

# Questions/Comments

